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**DESIGN DIVISION DRAINAGE MANUAL  
REVISION 23-02**

**TO:** TDOT Design Division Drainage Manual Users

**FROM:** Jennifer Lloyd, Civil Engineering Director  
Headquarters Roadway Design and Aerial Surveys Division

**DATE:** August 7, 2023

**SUBJECT:** Revision to Chapter 7 of the Design Division Drainage Manual

Section 7.03.4.1, PIPE TYPE AND COVER CRITERIA, and Section 7.04.5.1, MANNING'S N-VALUES FOR PIPE MATERIALS, of Chapter 7 of the Design Division Drainage Manual have been updated. In addition, Section 7.06.2.3, Example Problem #3: Storm Sewer System Analysis, was updated.

**7.03.4.1 Pipe Type and Cover Criteria**

Table 6A-1, "Pipe Selection Criteria Based on System and Fill Height" provides guidance for choosing storm water pipes for different roadway classifications. Alternate pipe types are permitted if they meet the criteria. The selection of pipe class is governed by the maximum depth of cover that will be placed on the pipe at any point along the pipe run. Typically, the maximum allowable cover will be determined by the maximum depths allowed for the catch basins or manholes to which the pipe will be connected.

**7.04.5.1 Manning's N-Values for Pipe Materials**

Pipe flow capacity will be computed by means of Manning's Equation. As water flows through a given pipe, its movement is resisted by friction between the water and the inside face of the pipe. The term "n" in Manning's Equation is a measure of the resistance to flow imposed by the pipe wall. The extent of this resistance is a function of texture of the wall surface, the inside shape of the wall, and turbulence at joints between sections of pipe.

The following table provides Manning's n-values used for design of various possible pipe materials:

Pipe Material	n-Value
Reinforced Concrete (pipe, elliptical or box)	0.013
HDPE or PP with smooth liner	0.013
HDPE, unlined	0.024
PVC, all types	0.013
Corrugated Metal	0.024
Steel Reinforced Thermoplastic Ribbed	0.013
Spiral Rolled Corrugated Metal	0.024

**TABLE 7-10**  
**MANNING'S N-VALUES FOR STORM SEWER PIPES**

**7.06.2.3 EXAMPLE PROBLEM #3: STORM SEWER SYSTEM ANALYSIS**

**SOLUTION:**

Sections 7.04.5.2 and 7.04.5.3 provide procedures which may be used in determining flow rates for storm sewer design and to compute the required pipe sizes and invert elevations. As discussed in Section 7.03.4.1, One of the common design assumptions for hydraulics is to use a Manning's n-value of 0.013, which is suitable for most pipe materials. The minimum pipe size will be 18 inches, as specified in Section 7.03.4.2. Because the flow rate computations are based on the Rational Method, it is first necessary to collect the appropriate Intensity-Duration-Frequency curve for the project. The following table depicts rainfall data determined for this project, using the appropriate methods described in Chapter 4.

The updated Chapter 7 of the Design Division Drainage Manual is located on the web site and can be found at the following link:

[https://www.tn.gov/content/dam/tn/tdot/roadway-design/documents/drainage\\_manual/DM-Chapter\\_07.pdf](https://www.tn.gov/content/dam/tn/tdot/roadway-design/documents/drainage_manual/DM-Chapter_07.pdf)

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